



Dart Aerospace Ltd.  
1270 Aberdeen St  
Hawkesbury, ON  
K6A 1K7  
Canada

Tel (613) 632-5200

**D6104-005**  
**Job Sheet 173746**



*-5053924-*  
*5053916*

Part No: D6104-005

Job Qty: 20 ea

Part Name: Round Billet, 17-4



Part Weight: 0 lbs

Status: Scheduled

Priority: Medium

Job Created: 3/6/18

Job Tracking No:

Due Date: 3/23/18

Created By: Marie Lajeunesse

Type: SOLD

Description:

Note: DWG REV B

Ship Via:

### Bill of Materials

### Job Routing

| Op No | Operation  | Qty    | Start Date | Due Date | Standard  |         | Workcenter/Supplier   |           | Sign-off      |
|-------|------------|--------|------------|----------|-----------|---------|-----------------------|-----------|---------------|
|       |            |        |            |          | Setup hrs | Run Hrs | Workcenter / Supplier | Lead Time |               |
| 100   | Purchasing | 20 pcs |            | 3/23/18  | 0.00      | 0.00    | Purchasing            |           | DAS 11 9-89   |
| 110   | Packaging  | 20 pcs |            | 3/23/18  | 0.00      | 0.00    | Packaging2            |           | DAS 11 9-89   |
| 120   | QC         | 20 pcs |            | 3/23/18  | 0.00      | 0.00    | QC18                  |           | 11 9-89       |
| 130   | Packaging  | 20 pcs |            | 3/23/18  | 0.00      | 0.00    | Packaging3-2          |           | 12/03/17 9-89 |
| 140   | QC21-SA    | 20 Ea  |            | 3/23/18  | 0.00      | 0.00    | QC21                  |           | MAR 27 2018   |

Part Op 100 - Issue P/O: 039228 b) Ø4.00" x 5.10" long d) Material: 17-4PH Stainless steel (Ams 5643 or Aisi 630)  
Descriptions: 110 - Ensure material certification is attached  
120 - Ensure Material certification comply to Dwg D6104  
130 - LOCATION: MAT043

MAR 06 2018

### Job BOM

| Part / Item | Component Name           | Quantity      | Operation      | Container |
|-------------|--------------------------|---------------|----------------|-----------|
| D6104-005P  | 17-4 SS Roundbar 4.00"Od | 20 pcs (1 ea) | 100-Purchasing |           |

### Job Allocations

| Operation      | Component Part | Required | Inventory | Allocated |
|----------------|----------------|----------|-----------|-----------|
| 100-Purchasing | D6104-005P     | 20       | 0         | 0         |

### Part Specifications

Specifications could not be found.

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

## WORK ORDER NON-CONFORMANCE / UPDATE



QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order update only ☐

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                                              |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------|--|
| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Suspected Unapproved <input type="checkbox"/> | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><div style="display: flex; justify-content: space-between;"> <div>           Skid-tube <input type="checkbox"/><br/>           Machining <input type="checkbox"/><br/>           Thermoforming <input type="checkbox"/><br/>           Large Fab <input type="checkbox"/> </div> <div>           Cross tube <input type="checkbox"/><br/>           Small Fab <input type="checkbox"/><br/>           Finishing <input type="checkbox"/><br/>           Composite <input type="checkbox"/> </div> <div>           Water Jet <input type="checkbox"/><br/>           Prod. Eng. Coord. <input type="checkbox"/><br/>           Rec/Store/Packaging <input type="checkbox"/><br/>           Supplier <input type="checkbox"/> </div> <div>           Engineering <input type="checkbox"/><br/>           Quality <input type="checkbox"/><br/>           Other <input type="checkbox"/> </div> </div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |                                              |  |
| Date :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Step #:                                                                                                                                                                            | QTY Effective :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | MRB (QSI042) Approval                        |  |
| Description Work Order Deviation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                    | Disposition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  | Completed By                                 |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | Lead hand / Supervisor Approval Verification |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | QC / QA Coordinator Approval                 |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                                              |  |
| <b>Root Cause</b><br><div style="display: flex; justify-content: space-between;"> <div>           Environment <input type="checkbox"/><br/>           Design <input type="checkbox"/><br/>           Doc/Data <input type="checkbox"/><br/>           Equip/Tooling <input type="checkbox"/><br/>           Handling/Pre <input type="checkbox"/><br/>           Material <input type="checkbox"/><br/>           Internal Transport <input type="checkbox"/><br/>           Tribal Knowledge <input type="checkbox"/><br/>           LOA <input type="checkbox"/><br/>           Substation <input type="checkbox"/><br/>           Past Expiry Date <input type="checkbox"/><br/>           Misidentified <input type="checkbox"/> </div> <div>           No Re-verification <input type="checkbox"/><br/>           Operator <input type="checkbox"/><br/>           Offset/Setup <input type="checkbox"/><br/>           Supplier <input type="checkbox"/><br/>           Training <input type="checkbox"/><br/>           Use for Testing <input type="checkbox"/><br/>           Poor Information <input type="checkbox"/><br/>           Rushing <input type="checkbox"/><br/>           Product Improvement <input type="checkbox"/><br/>           Process Improvement <input type="checkbox"/><br/>           Manufacturing Process <input type="checkbox"/><br/>           Past Due <input type="checkbox"/> </div> </div> |                                                                                                                                                                                    | <b>FAULT CATEGORY</b><br><div style="display: flex; justify-content: space-between;"> <div>           Pressure/Forced <input type="checkbox"/><br/>           Bending <input type="checkbox"/><br/>           Centre Not Concentric <input type="checkbox"/><br/>           Cracks <input type="checkbox"/><br/>           Crimp/Kink/Ripple/Wave <input type="checkbox"/><br/>           Cuffs <input type="checkbox"/><br/>           Crushing <input type="checkbox"/><br/>           Heat Treat <input type="checkbox"/><br/>           Wave/Twist in Tube <input type="checkbox"/><br/>           Marks/Chatter <input type="checkbox"/> </div> <div>           Temperature/Cure <input type="checkbox"/><br/>           Set-up <input type="checkbox"/><br/>           BOM/Route <input type="checkbox"/><br/>           Broken/Damage/Defect <input type="checkbox"/><br/>           Inspection Incomplete/Unqualified <input type="checkbox"/><br/>           Contamination <input type="checkbox"/><br/>           Countersink <input type="checkbox"/><br/>           Cut Too Short <input type="checkbox"/><br/>           Instructions Incomplete/Unclear <input type="checkbox"/><br/>           Drill Holes <input type="checkbox"/> </div> <div>           Power Loss/Surge <input type="checkbox"/><br/>           Folio/Program <input type="checkbox"/><br/>           Grain <input type="checkbox"/><br/>           Weld <input type="checkbox"/><br/>           Wrong Stock Pulled <input type="checkbox"/><br/>           Out of Sequence <input type="checkbox"/><br/>           Off-set <input type="checkbox"/><br/>           Mislabeled <input type="checkbox"/><br/>           Fit/Function <input type="checkbox"/><br/>           Misaligned/off center <input type="checkbox"/> </div> <div>           Positioned Wrong <input type="checkbox"/><br/>           Outside Dimensions <input type="checkbox"/><br/>           Over/Under tolerance <input type="checkbox"/><br/>           Part Incorrect <input type="checkbox"/><br/>           Part Lost/Missing <input type="checkbox"/><br/>           Part Moved <input type="checkbox"/><br/>           Drawing <input type="checkbox"/><br/>           Finish <input type="checkbox"/><br/>           Misread <input type="checkbox"/><br/>           Turning Sequence <input type="checkbox"/> </div> </div> |  |                                              |  |
| OTHER : <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                                              |  |



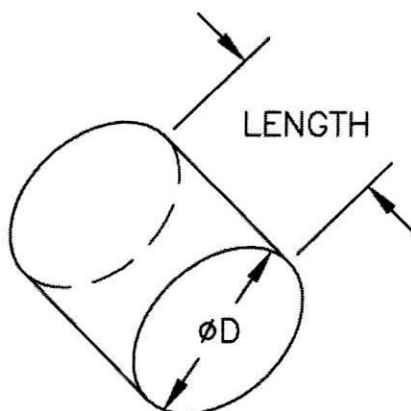


|                               |                                |                                                                        |                        |
|-------------------------------|--------------------------------|------------------------------------------------------------------------|------------------------|
| DESIGN<br><i>[Signature]</i>  | DRAWN BY<br><i>[Signature]</i> | <b>DART AEROSPACE LTD</b><br>HAWKESBURY, ONTARIO, CANADA               |                        |
| CHECKED<br><i>[Signature]</i> | APPROVED<br><i>[Signature]</i> | DRAWING NO.<br>D6104                                                   | Rev. B<br>SHEET 1 OF 1 |
| DATE<br>02.11.25              |                                | TITLE<br>ROUND BILLET, 17-4                                            | SCALE<br>NTS           |
| A                             | 01.04.10                       | NEW ISSUE                                                              |                        |
| B                             | 02.11.25                       | CLARIFY ALLOY SPEC<br>ADDED D6104-009/-011<br>REDUCE LENGTH OF BILLETS |                        |

RELEASED

02.11.29 *[Signature]*

## SPECIFICATION CONTROL DRAWING



SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER

173746 MLW

18-03-06

MATERIAL: 17-4 PH SS (AMS 5643 OR AISI 630) MIN UTS = 170 KSI (38 HRC)

PURCHASE MATERIAL ACCORDING TO THE FOLLOWING TABLE. SPECIFY ALLOY, DIAMETER x LENGTH (+0.030/-0.000) AS SHOWN.

TOLERANCE ON ALL DIMENSIONS IS +0.030/-0.000.

ALL DIMENSIONS ARE IN INCHES

| Part No.  | Alloy                   | D<br>(Diameter) | Length |
|-----------|-------------------------|-----------------|--------|
| D6104-001 | 17-4 PH STAINLESS STEEL | Ø3.00           | 3.80   |
| D6104-003 | 17-4 PH STAINLESS STEEL | Ø3.25           | 3.80   |
| D6104-005 | 17-4 PH STAINLESS STEEL | Ø4.00           | 5.10   |
| D6104-007 | 17-4 PH STAINLESS STEEL | Ø4.50           | 5.10   |
| D6104-009 | 17-4 PH STAINLESS STEEL | Ø5.25           | 4.10   |
| D6104-011 | 17-4 PH STAINLESS STEEL | Ø6.50           | 4.10   |
|           |                         |                 |        |
|           |                         |                 |        |

Copyright © 2001 by DART AEROSPACE LTD

THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

**WORK ORDER NON-CONFORMANCE / UPDATE**

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order update only ☐

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |                                                                                                                                                            |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Suspected Unapproved <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><div style="display: flex; justify-content: space-between;"> <div>           Skid-tube <input type="checkbox"/><br/>           Machining <input type="checkbox"/><br/>           Thermoforming <input type="checkbox"/><br/>           Large Fab <input type="checkbox"/> </div> <div>           Cross tube <input type="checkbox"/><br/>           Small Fab <input type="checkbox"/><br/>           Finishing <input type="checkbox"/><br/>           Composite <input type="checkbox"/> </div> <div>           Water Jet <input type="checkbox"/><br/>           Prod. Eng. Coord. <input type="checkbox"/><br/>           Rec/Store/Packaging <input type="checkbox"/><br/>           Supplier <input type="checkbox"/> </div> <div>           Engineering <input type="checkbox"/><br/>           Quality <input type="checkbox"/><br/>           Other <input type="checkbox"/> </div> </div> |  |  |                                                                                                                                                            |  |  |
| Date :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  | Step #:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  | QTY Effective :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  | <b>MRB (QSI042) Approval</b><br><br>Completed By _____<br><br>Lead hand / Supervisor Approval Verification _____<br><br>QC / QA Coordinator Approval _____ |  |  |
| Description Work Order Deviation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | Disposition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |                                                                                                                                                            |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |                                                                                                                                                            |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |                                                                                                                                                            |  |  |
| <b>Root Cause</b><br><div style="display: flex; justify-content: space-between;"> <div>           Environment <input type="checkbox"/><br/>           Design <input type="checkbox"/><br/>           Doc/Data <input type="checkbox"/><br/>           Equip/Tooling <input type="checkbox"/><br/>           Handling/Pre <input type="checkbox"/><br/>           Material <input type="checkbox"/><br/>           Internal Transport <input type="checkbox"/><br/>           Tribal Knowledge <input type="checkbox"/><br/>           LOA <input type="checkbox"/><br/>           Substation <input type="checkbox"/><br/>           Past Expiry Date <input type="checkbox"/><br/>           Misidentified <input type="checkbox"/> </div> <div>           No Re-verification <input type="checkbox"/><br/>           Operator <input type="checkbox"/><br/>           Offset/Setup <input type="checkbox"/><br/>           Supplier <input type="checkbox"/><br/>           Training <input type="checkbox"/><br/>           Use for Testing <input type="checkbox"/><br/>           Poor Information <input type="checkbox"/><br/>           Rushing <input type="checkbox"/><br/>           Product Improvement <input type="checkbox"/><br/>           Process Improvement <input type="checkbox"/><br/>           Manufacturing Process <input type="checkbox"/><br/>           Past Due <input type="checkbox"/> </div> </div> |  | <b>FAULT CATEGORY</b><br><div style="display: flex; justify-content: space-between;"> <div>           Pressure/Forced <input type="checkbox"/><br/>           Bending <input type="checkbox"/><br/>           Centre Not Concentric <input type="checkbox"/><br/>           Cracks <input type="checkbox"/><br/>           Crimp/Kink/Ripple/Wave <input type="checkbox"/><br/>           Cuffs <input type="checkbox"/><br/>           Crushing <input type="checkbox"/><br/>           Heat Treat <input type="checkbox"/><br/>           Wave/Twist in Tube <input type="checkbox"/><br/>           Marks/Chatter <input type="checkbox"/> </div> <div>           Temperature/Cure <input type="checkbox"/><br/>           Set-up <input type="checkbox"/><br/>           BOM/Route <input type="checkbox"/><br/>           Broken/Damage/Defect <input type="checkbox"/><br/>           Inspection Incomplete/Unqualified <input type="checkbox"/><br/>           Contamination <input type="checkbox"/><br/>           Countersink <input type="checkbox"/><br/>           Cut Too Short <input type="checkbox"/><br/>           Instructions Incomplete/Unclear <input type="checkbox"/><br/>           Drill Holes <input type="checkbox"/> </div> <div>           Power Loss/Surge <input type="checkbox"/><br/>           Folio/Program <input type="checkbox"/><br/>           Grain <input type="checkbox"/><br/>           Weld <input type="checkbox"/><br/>           Wrong Stock Pulled <input type="checkbox"/><br/>           Out of Sequence <input type="checkbox"/><br/>           Off-set <input type="checkbox"/><br/>           Mislabeled <input type="checkbox"/><br/>           Fit/Function <input type="checkbox"/><br/>           Misaligned/off center <input type="checkbox"/> </div> <div>           Positioned Wrong <input type="checkbox"/><br/>           Outside Dimensions <input type="checkbox"/><br/>           Over/Under tolerance <input type="checkbox"/><br/>           Part Incorrect <input type="checkbox"/><br/>           Part Lost/Missing <input type="checkbox"/><br/>           Part Moved <input type="checkbox"/><br/>           Drawing <input type="checkbox"/><br/>           Finish <input type="checkbox"/><br/>           Misread <input type="checkbox"/><br/>           Turning Sequence <input type="checkbox"/> </div> </div> |  | OTHER : _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |  |                                                                                                                                                            |  |  |



# MATERIAL RECEIPT INSPECTION FORM

MATERIAL: D6104-005  
 DATE: MAR 22 2018

PO / BATCH NO.: 039228/5053916

MATERIAL CERT REC'D: yes  
 QUANTITY RECEIVED: 20 pcs  
 QUANTITY INSPECTED: 20 pcs  
 QUANTITY REJECTED: 0

THICKNESS ORDERED: 4.00  
 THICKNESS RECEIVED: 4.00  
 SHEET SIZE ORDERED: N/A  
 SHEET SIZE RECEIVED: N/A

| DESCRIPTION                                     | NCR<br>(Check Y/N) |          | COMMENTS            |
|-------------------------------------------------|--------------------|----------|---------------------|
| SURFACE DAMAGE                                  | Y                  | <u>N</u> |                     |
| CORRECT FINISH                                  | <u>Y</u>           | N        |                     |
| CORROSION                                       | Y                  | <u>N</u> |                     |
| CORRECT GRAIN DIRECTION                         | <u>Y</u>           | N        |                     |
| CORRECT MATERIAL PER M-DRAWING                  | <u>Y</u>           | N        | <u>Am 55643</u>     |
| CORRECT THICKNESS                               | <u>Y</u>           | N        |                     |
| PHOTO REQUIRED                                  | Y                  | <u>N</u> |                     |
| CORRECT REF # TO LINK CERT                      | <u>Y</u>           | N        | <u>Head # 653 N</u> |
| CORRECT MATERIAL IDENTIFICATION                 | <u>Y</u>           | N        |                     |
| CORRECT M# ON THE MATERIAL                      | <u>Y</u>           | N        |                     |
| DOES THIS MATERIAL REQUIRE ENGINEERING SIGN OFF | Y                  | <u>N</u> |                     |
| DOES THIS REQUIRE AN EXTRUSION REPORT           | Y                  | <u>N</u> |                     |

| CUT SAMPLE PIECE OF MATERIAL AND PREFORM A HARDNESS CHECK.<br>RECORD RESULTS BELOW |     |     |       |       |         |
|------------------------------------------------------------------------------------|-----|-----|-------|-------|---------|
| TYPE OF MATERIAL                                                                   | HRC | HRB | DUR A | DUR D | WEBSTER |
| SIZE OF TEST SAMPLE                                                                |     |     |       |       |         |
| HARDNESS / DUROMETER READING                                                       |     |     |       |       |         |

testers located in the Quality Office

| QC 18 INSPECTION                                             | ENGINEERING SIGNOFF (if required)   |
|--------------------------------------------------------------|-------------------------------------|
| INSPECTED BY: <u>DAS 11</u><br>DATE: <u>9-89 MAR 22 2018</u> | SIGNED OFF BY: _____<br>DATE: _____ |

Attach this inspection sheet with the corresponding material cert and remit to be scanned and received in

**Castle Metals®**

A. M. Castle &amp; Co.

PACKING SLIP  
CERTIFICATE OF CONFORMANCE

Page 1 of 2

Shipment No:3546734

|                                                                                                    |                         |                                                                                        |  |                                                                                         |  |                                                                                              |  |
|----------------------------------------------------------------------------------------------------|-------------------------|----------------------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------|--|
| <b>Ship From:</b><br>A. M. CASTLE & CO.<br>2150 ARGENTIA ROAD<br>MISSISSAUGA, ON L5N<br>2K7<br>CAN |                         | <b>Sold To:</b><br>DART AEROSPACE LTD<br>1270 ABERDEEN<br>HAWKESBURY, ON K6A 1K7<br>CA |  | <b>Ship To:</b><br>DART AEROSPACE LTD<br>1270 ABERDEEN<br>HAWKESBURY, ON<br>K6A 1K7 CAN |  | <b>Deliver To:</b><br>DART AEROSPACE LTD<br>1270 ABERDEEN<br>HAWKESBURY, ON<br>K6A 1K7<br>CA |  |
| <b>Date Shipped</b><br>21-MAR-18                                                                   | <b>F.O.B.</b><br>ORIGIN | <b>Freight Terms</b><br>Prepaid                                                        |  | <b>Carrier</b><br>MANITOULIN                                                            |  | <b>BOL No</b><br>3546734-2                                                                   |  |

|                   |                                |                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                               |     |             |             |                  |
|-------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-------------|-------------|------------------|
| Shipment Details  |                                |                                                                                                                                                                                                                                                                                                                   | Final Destination Branch - TOR                                                                                                                                                                                                                                                                                                                                                |     |             |             |                  |
| Order No          | Line No                        | Item No                                                                                                                                                                                                                                                                                                           | Description                                                                                                                                                                                                                                                                                                                                                                   |     |             |             |                  |
| 5068629           | 1                              | 42464.MO                                                                                                                                                                                                                                                                                                          | 4.0000.RD.17CR-4NI.STAINLESS.RT.SOL.TR.COND<br>A.132.0000-156.0000<br>CUT TO 5.1 IN ( + .1250/- .0000 IN (DO NOT USE HT # 35864)) -<br>BAND SAW CUTTING SPECIFICATIONS: AMS 5643<br>ALL PAPERWORK MUST FOLLOW ORDER / CUSTOMER MUST<br>RECEIVE AT TIME OF DELIVERY<br>ALL MATERIAL MUST HAVE IDENTIFYING MARKINGS EX:HEAT #'S<br>Email P/s and certs to: clavoie@dartaero.com |     |             |             |                  |
| Purchase Order No |                                | Part Number                                                                                                                                                                                                                                                                                                       | Ordered Qty                                                                                                                                                                                                                                                                                                                                                                   |     | Invoice Qty |             |                  |
| 39228             |                                | YOUR ITEM NUMBER:<br>D6104-005                                                                                                                                                                                                                                                                                    | 20.00 PCS                                                                                                                                                                                                                                                                                                                                                                     |     | 20.00 PCS   |             |                  |
| Details           |                                | DO NOT USE HT # 35864 (NORTH AMERICAN STAINLESS ONLY)<br>ALL PAPERWORK MUST FOLLOW ORDER / CUSTOMER MUST RECEIVE AT TIME OF DELIVERY<br>ALL MATERIAL MUST HAVE IDENTIFYING MARKINGS EX:HEAT #'S<br>Email P/s and certs to: clavoie@dartaero.com<br>END USER: DART AEROSPACE<br>END USE: COMMERCIAL AIRCRAFT PARTS |                                                                                                                                                                                                                                                                                                                                                                               |     |             |             |                  |
| Delivery No.      | Mill/Source                    | Heat Number                                                                                                                                                                                                                                                                                                       | Mech Id                                                                                                                                                                                                                                                                                                                                                                       | PCS | Width (IN)  | Length (IN) | Shipped Qty(LBS) |
| 121695068         | NORTH<br>AMERICAN<br>STAINLESS |                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                               | 20  |             |             | 374.5814         |

Date Printed: 21-MAR-2018 03:00:02 PM



**Castle Metals®**

A. M. Castle & Co.

PACKING SLIP/  
CERTIFICATE OF CONFORMANCE

Page 2 of 2

|  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|

We hereby certify the material covered by this certification conforms in accordance with the above specifications and has been found to meet the applicable requirements for the material, including any specifications forming a part of the description. Test reports are on file subject to examination. All claims for defective material are waived unless made in writing to A.M. Castle & Co. within 60 days of the shipment. Material cut to the correct size, or material cut by the customer cannot be returned for credit.

Reviewed by Authorized Castle Metals Representative

Date:

Name

MAR 21 2018







NORTH AMERICAN  
STAINLESS

# METALLURGICAL TEST REPORT

6870 Highway 42 East  
Ghent, KY 41045-9615  
(502) 347-6000

Certificate: 380478 01      Mail To:      Ship To:      Date: 2/11/2018      Page: 1 OF 1  
A.M. CASTLE AND COMPANY      A.M. CASTLE AND COMPANY  
1420 KENSINGTON ROAD-SUITE 210      199 CANAL RD.  
OAK BROOK      IL 60523      FAIRLESS HILLS      PA 19030  
Customer: 0032 026  
NAS Order: LP 73523 1      Red Ratio: 4.7 :1      Heat Treat Code: 44,938  
Your Order: 444330-1      Item Code: 42464  
Dia/Thk: 4.0000 in  
Log Length: 144.00 in  
Corrosion:

## PRODUCT DESCRIPTION:

AMS 2303E, AMS 5643R  
Round Bar, Hot Rolled, Annealed, Rough Turned  
UNS S17400; EN 10204 3.1, ASTM A484/16, MACRO OK, AMS 5643D  
ASTM A564/13, AMS 2303P, ASME SA564-07, ASTM F899/12b  
SOL. ANNEALED @ 1900F MIN FOR 1 HR MIN. and air cooled to RT  
H900 MECH. PROPERTIES ARE CAPABILITY ONLY\*

## REMARKS:

COMPLIES W/REQUIREMENTS OF DFAR 252.225-7009 EU DIRECTIVE  
2011/65/EU.ROHS. EAF+AOD+CC. NO WELD REPAIR. MELTED AND MFG  
IN USA FREE FROM MERCURY AND LOW MELTING ALLOY CONTAMINATION

| Bundle Weight | Bundle Weight | Bundle Weight | Bundle Weight | Bundle Weight | Bundle Weight | Bundle Weight | Bundle Weight | Bundle Weight | Bundle Weight |
|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| BJ27849       | 1515          |               |               |               |               |               |               |               |               |

Lab Accreditation Bureau, ISO/IEC 17025, Certificate# L2323

CHEMICAL ANALYSIS      CM(Country of Melt)      ES(Spain)      US(United States)      ZA(South Africa)      JP(Japan)      Chemical Analysis per ASTM A751/16a

| NAS Heat | Supplier Heat | CM | C %   | CB % | CO %  | CR %  | CU % | MN % | MO % | N %  | NI % | P %  |
|----------|---------------|----|-------|------|-------|-------|------|------|------|------|------|------|
| 653N     |               | US | .021  | .170 | .07   | 15.23 | 3.12 | .83  | .094 | .022 | 4.19 | .018 |
|          |               |    | S %   | SI % | TA %  | TI %  |      |      |      |      |      |      |
|          |               |    | .0139 | .69  | .0110 | .0030 |      |      |      |      |      |      |

## MECHANICAL PROPERTIES

|         | 1<br>0<br>1<br>c<br>r | HB<br>No. | Grain<br>No. | Ferrite<br>% | TS-900CAP<br>KSI | YS-900CAP<br>KSI | EL-900CAP<br>% 4D | RA-900CAP<br>% | RC-900CAP<br>No. | FREQ.<br>No. | SEV.<br>No. |
|---------|-----------------------|-----------|--------------|--------------|------------------|------------------|-------------------|----------------|------------------|--------------|-------------|
| BJ27849 | R L                   | 341.0     | 7.0          | .73          | 201.65           | 179.13           | 13.08             | 46.48          | 42.0             | .18          | .09         |



NAS hereby certifies that the analysis on this certification is correct. Based upon the results and the accuracy of the test methods used, the material meets the specifications stated. These results relate only to the items tested and this report cannot be reproduced, except in its entirety, without the written approval of NAS

Technical  
Dept. Mgr.

KRIS LARK